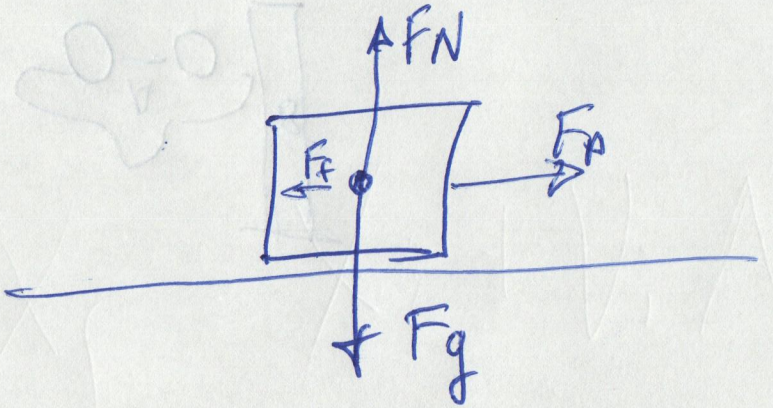
2nd Law

$\vec{F}_R = m\vec{a}$

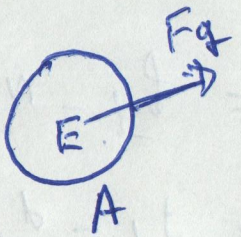
Ch. 10 $a = 10 m/s^2$

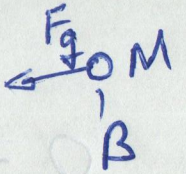


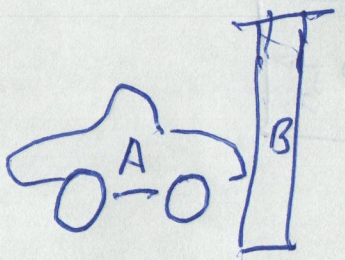
$F_x = F_p - F_f = ma_x$

$F_y = F_N - F_g = ma_y = 0$

Newton's 3rd Law

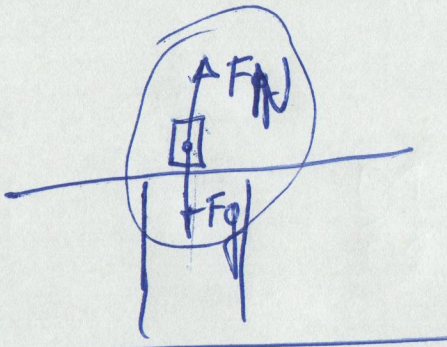






Car on Wall

Wall on Car



F_N - Table pushes box up
(A on B)
opposite Box pushes table down.
(B on A)

F_g - Earth pulls box down.
(A on B)

Box pulls Earth Up
(B on A)

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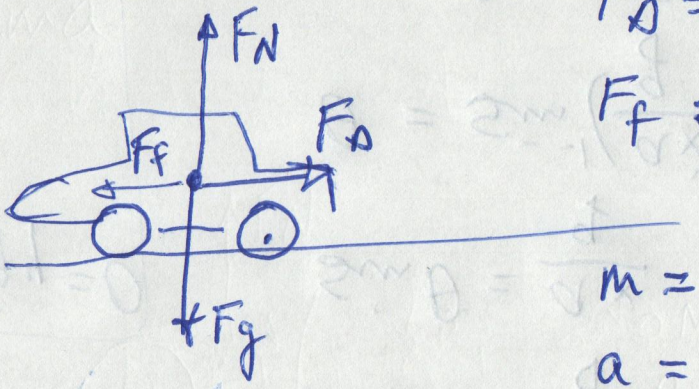


$F_D = 5000N$

$F_f = ?$

$m = 1100kg$

$a = 3m/s^2$

$F_{Ry} = 0 = F_N - F_g$

$F_{Rx} = F_D - F_f = ma_x$

a) $F_{Rx} = ma_x = (1100kg)(3m/s^2)$

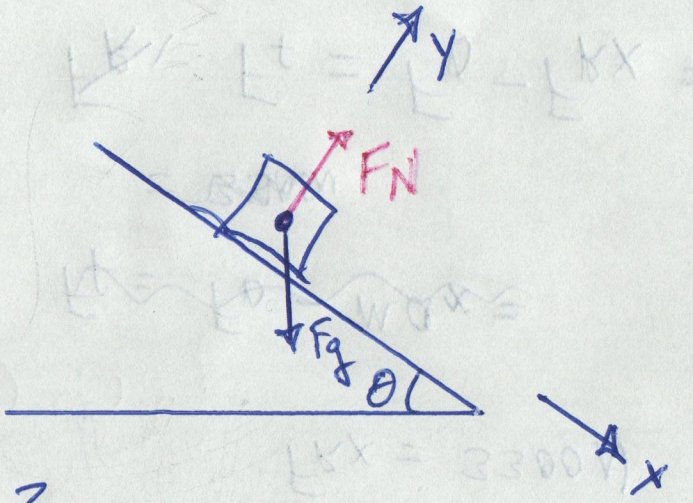
$F_{Rx} = 3300N$

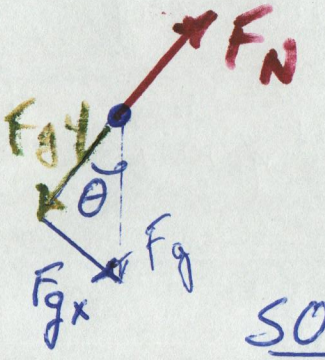
b) ~~$F_f = F_D - ma_x =$~~

~~$= 3300N$~~

F_{R1} $F_f = F_D - F_{Rx} = 5000N - 3300N$

$F_f = 1700N$





$\theta = ?$

$m = 5.0\,kg$

$a = 3.0\,m/s^2$

SOH

$F_{gx} = F_g \sin\theta$

$F_{gx} = mg\sin\theta$

$F_x = F_{gx} = ma_x$ ⟷

2nd Law

$ma_x = mg\sin\theta$

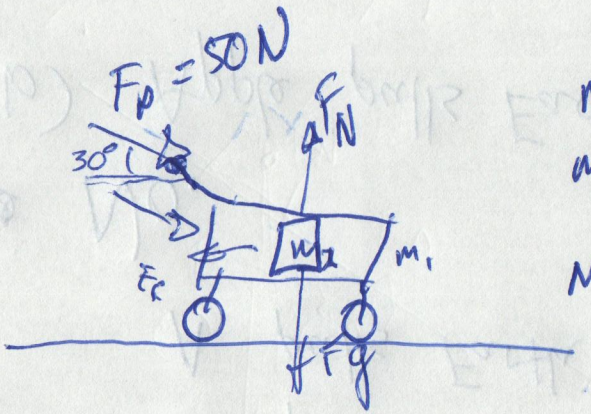
$F_y = F_N - F_{gy} = 0$

$\sin\theta = \frac{a_x}{g}$

$\theta = \sin^{-1}\left(\frac{a_x}{g}\right) = \sin^{-1}\left(\frac{3.0\,m/s^2}{9.8\,m/s^2}\right)$

$\theta = 17.8^\circ = 18^\circ$

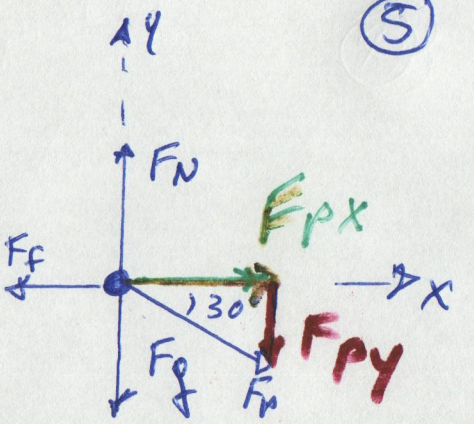
$\boxed{\theta = 18^\circ}$



$m_1 = 10kg$

$m_2 = 30kg$

$M = 40kg$



CAH

$F_{px} = F_p \cos\theta$

SOH

$F_{py} = F_p \sin\theta$

$F_x: F_{px} - F_f = ma_x = 0$

$F_{px} = F_f$

a) $F_f = F_{px} = F_p \cos 30°$

$F_f = (50N)\cos 30°$

$F_f = 43N$

b) $F_y: F_N - F_g - F_{py} = ma_y = 0$

$F_N = F_g + F_{py} = mg + F_p \sin 30°$

$F_N = (40kg)(9.8 m/s^2) + (50N)\sin 30°$

$F_N = 417N$

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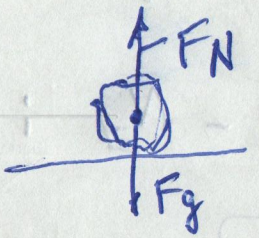
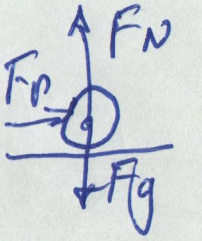




a) Apple (A) Table (B)

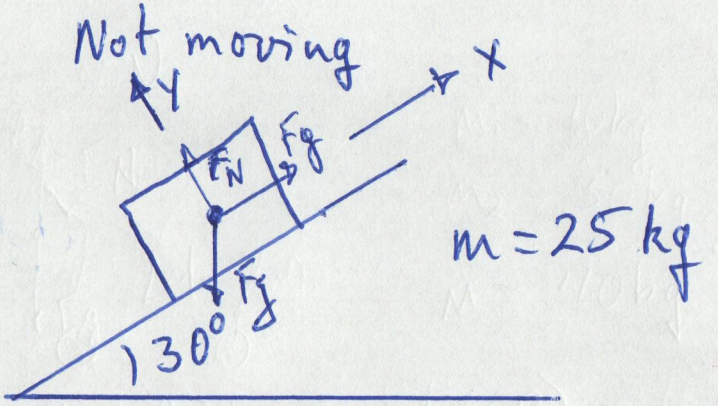
F_N: B pushes A up
A pushes B down

F_g: Apple (A) Earth (B)
B pulls A down
A pulls Earth up

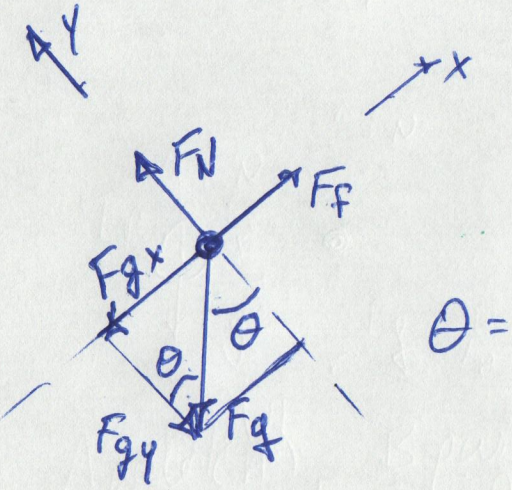
i No.

b) Apple pulls Earth up.

Apple (A) B pushes
B pushes on A
A pushes back on B



$m = 25\ kg$



$\theta = 30°$

F_x: $F_f - F_{gx} = ma_x = 0$

$F_f = F_{gx} = mg \sin 30°$

$F_f = (25\ kg)(9.8\ m/s^2) \sin 30°$

$F_f = 122.5\ N$

$\boxed{F_f = 120\ N}$

SOH

$F_{gx} = F_g \sin 30°$

$F_g = mg$

F_y: